

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

INTERIM STANDARD

AGRICHEMICAL HANDLING FACILITY

(Ea.)

CODE 702

DEFINITION

An environmentally safe permanent structure used for the filling of tanks and the mixing of chemicals (insecticides, herbicides, fungicides, fertilizer, etc.) for agricultural operations and for the safe storage of chemicals used in these operations.

PURPOSE

To reduce pollution of surface water, ground water, and soil by providing a permanent roofed structure with an impervious surface to safely mix and load chemicals and retain incidental spillage.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where: (1) the lack of adequate facilities for the mixing of chemicals creates significant potential for pollution of surface water, ground water, and soil; (2) a water supply is adequate for filling the application equipment tanks and rinsing the application equipment and chemical containers; (3) soils and topography are suitable for construction, and (4) where an impermeable pad is required to properly manage chemical operations.

CRITERIA

Each agrichemical handling facility shall be designed to meet the needs of the user and shall be in conformance with this standard and all federal, state, and local laws.

The planning, design, and construction shall ensure that the structure is sound and of durable materials commensurate with the anticipated service life,

initial and replacement costs, and safety and environmental considerations.

System Components

The agrichemical handling facility shall include those components necessary to properly manage the chemical materials and prevent pollution of the environment. Components of a complete agrichemical handling facility shall include but not be limited to the following:

1. A roofed building with concrete pad for chemical mixing and filling of equipment.
2. Chemical collection sump, pump, and safety devices.
3. Adequate water supply for mixing chemicals, rinsing chemical containers and tanks, and rinsing the chemical mixing pad.
4. Water supply pipeline and back flow prevention devices and where needed a well and pump.
5. Water hoses and nozzles for filling tanks and rinsing of chemical containers and chemical mixing pad.
6. Emergency shower/eyewash station.
7. Tanks for storage of rinse water for later use as a pesticide or diluent.
8. A device such as a sized volume nurse tank or cut off valve used to prevent sprayer tank overflow.
9. A storage space adequate for short term storage of materials commonly used at the site.

10. Warning signs, fire extinguisher, first aid kit, protective clothing, and other appropriate safety devices.
11. Electrical components such as lights, heaters, fans, controls, etc.

Location

The agrichemical handling facility shall be located as follows:

1. Adjacent to or as near the chemical storage building as practical if storage is not part of the handling facility.
2. As far as practical from streams, ponds, lakes, wetlands, and wells with a recommended minimum distance of 100 feet.
3. As far as practical from known sinkholes and subsurface anomalies with a recommended minimum distance of 100 feet.
4. Isolated from other buildings used to store feed, seed, petroleum products, livestock or from residences and located downwind of these buildings. A minimum of 200 feet from residences or other occupied buildings is recommended.
5. Located above the 25-year flood plain elevation. Where practical, location above the 100-year flood plain elevation is recommended. Elevated above the surrounding ground to prevent runoff from entering the facility.
6. At least 100 feet from any existing chemical loading site.

Foundation Preparation

All top soil, organic matter, and debris shall be removed from the site. The concrete slab and granular subbase shall be situated on firm, uniform foundation material. The subgrade surface shall be compacted prior to placement of the granular subbase.

Size and Capacity

The size of the concrete pad used for chemical mixing shall accommodate the length, width, and height of the largest sprayer used in the facility with adequate space for maneuvering and equipment access. Additional space shall be included as necessary to accommodate worker access, tanks, pumps, hoses, and other necessary equipment.

The chemical mixing pad shall be sloped to allow for drainage of water and pesticide spills to a collection sump. The chemical mixing pad shall be sloped a minimum of 2% (¼ inch per foot) toward the sump. The chemical mixing pad shall be curbed to prevent outside runoff water from entering and for providing storage of chemical spills. The chemical mixing pad including the sump shall have a storage capacity of 1.25 times the largest storage or spray tank brought onto the pad. However, the storage capacity shall not be less than 250 gallons.

The entrance to the chemical mixing pad shall be graveled, paved, or otherwise treated to provide a suitable entrance for the equipment and to prevent erosion and the tracking of sediment onto the chemical mixing pad. The treated entrance length shall be at least 1.5 times the largest wheel circumference.

Water Supply, Pump, and Pipe

A permanent water supply shall be provided for filling the sprayers, rinsing the chemical containers, spray tanks, and chemical mixing pad, and for emergency washing. A pipeline shall be installed for conveyance of water from the water supply to the agrichemical handling facility. Back flow preventers, antisiphon devices or a minimum 2-inch air gap shall be installed on all water supply lines. If a pump and well are installed, it shall be located outside of the chemical mixing pad and meet the distance requirements listed under Location.

Roofed Building

The agrichemical handling facility shall be roofed to prevent rainfall from entering the system. Enclosure supports shall not penetrate into or through the concrete pad area. The enclosure shall have adequate clearance between the lowest chord of the roof and the highest area of the pad for the equipment used or 10 feet whichever is higher. On open buildings, the enclosure shall have a minimum roof overhang of 30° from vertical edge of the concrete pad in all directions or 2 feet, whichever is greater to prevent rain from blowing in on the chemical mixing pad. Side walls may be constructed on one or more sides to reduce the amount of overhang required. Fully enclosed building shall be adequately ventilated when occupied.

Emergency Shower/Eyewash Station

The emergency wash area shall include an overhead shower/eyewash and wash basin for

washing when the applicator's skin is exposed to chemicals. The emergency washing area shall be conveniently located on the pad and easily accessible to the applicator.

Loading Platform

Raised platforms where needed to facilitate the filling of the spray equipment shall be of sufficient height and size so as to provide a safe working area.

Stationary Nurse Tank

To prevent overflow of the spray tank, a nurse tank with adjustable float valve may be installed. In lieu of a nurse tank, an automatic cut-off valve may be used to prevent spray tank overflow.

Rinsate Storage Tanks

Rinsate storage tanks shall be provided to temporarily hold rinsates resulting from cleaning of the chemical mixing pad or sprayer. Tanks shall be fiberglass, polyethylene, or other material resistant to the chemicals used and have the capacity to meet the requirements of the operation plan. The rinsate tanks shall be located so that any spillage or overflow drains to the sump. Tanks should be mounted high enough to provide gravity flow into mix tanks or sprayers.

Sump

The sump size shall be as small as practical but of sufficient size that it will easily accommodate the pump and provide easy access for the removal of accumulated sediment. Load pad sumps should be covered with a metal grate sufficient to support the application equipment. The sump may be concrete or stainless steel.

Sump Pump

The sump pump shall be a chemical resistant submersible pump and should create a minimum of turbulence within the sump. A filter shall be installed between the sump pump and sprayer or rinsate tanks. All electrical components shall be waterproof and explosive proof. The pump shall be operated by a manual switch.

Plumbing

No appurtenances, discharge outlets, drains or other piping shall be installed through the pad, curb, or sump in areas subject to contamination. All

plumbing shall be designed to allow for easy drainage to prevent freezing.

Structural Design

Minimum structural requirement for agrichemical handling facilities are specified as follows:

1. Steel construction shall conform to AISC Specification for the Design, Fabrication, Erection of Structural Steel for Buildings.
2. Structural timber components shall conform to NFPA National Design Specifications for Wood Construction.
3. Reinforcing steel shall conform to ASTM A 615, Grade 60.
4. Enclosure. Building shall be designed for applicable wind and dead loads in conformance with local building codes. Where no local building code governs, the loadings shall be as specified in ASAE EP 288.
5. Concrete. A watertight concrete design shall be used to avoid leakage from the sump and chemical mixing pad. A minimum of 4 in. of well compacted granular subbase shall be placed prior to concrete placement. Pad and sump thickness and reinforcement shall be designed based on the wheel loads of existing or anticipated equipment when loaded, the loads anticipated by storage tanks and other equipment, or temperature and shrinkage reinforcement whichever is greater. However, the minimum concrete thickness of slabs and sump shall be 6 in. and 8 in. respectively. The minimum reinforcement for 6 in. slabs shall be equal to that of #4 bars on 12 in. centers. Concrete mix design shall meet the following requirements:
 - a. A minimum design 28-day compressive strength of 4000 psi and maximum water/cement ratio of 0.5 (minimum of 6 bags of cement per cubic yard).
 - b. Portland cement Type II shall be used.
 - c. The maximum size aggregate used shall be 1 inch.
 - d. Air entrainment shall be 5% to 7.5% by volume.

- e. Slump of the concrete shall be 3 ± 1 inches. Super plasticizer may be used to increase the slump to facilitate placement.
- f. Wet curing shall be for a minimum of 7 days (14 days when pozzolan is used) or the application of a liquid membrane forming curing compound (ASTM C 309) shall be used.
- g. The slab and sump shall be placed in one continuous placement and without construction joints or openings if possible. Where construction joints were unavoidable a PVC waterstop shall be installed.
- h. Control joints spaced at maximum spacings of 30 ft. on center in both directions should be used to control cracking. All control joints shall be filled with a flexible sealant (elastomeric sealers) to prevent leakage.
- i. Polypropylene fiber reinforcing shall be used in the concrete mix to reduce shrinkage cracking.

The concrete sump shall be protected by a surface applied impervious coating to prevent deterioration of the concrete and absorption of pesticides. The coating material selected shall remain flexible after curing, aging, cold weather, and exposure to the pesticides.

CONSIDERATIONS

Water Quantity

The agrichemical handling facility should not cause a significant change in water use at the site.

Water Quality

The quality of surface runoff and ground water will be improved due to the capture and reuse of agricultural chemicals during mixing and rinsing operations and from the proper storage of materials.

On-Site Chemical Storage

Provide separate storage areas for pesticides, fertilizer, and other chemicals stored in the facility. Consideration should also be given to storage of emptied chemical containers. Storage areas should be secured for safety and should be accessible to the emergency washing area and include appropriate safety devices including ventilation,

lighting, fire extinguisher (rating not less than 20-B), and smoke detector with audible alarm.

Equipment

The sump pump, hoses, pipes, valves, seals, connectors, filters, tanks, waterstops, and related plumbing material must be compatible with the chemicals being handled. Suction hoses must be reinforced to withstand negative pressures. All piping and controls should be installed such that leaks can be readily detected and repairs or maintenance can be easily performed.

Entrance

If the entrance is treated with gravel, large crushed stone (1.5 inch minimum) should be used to prevent tracking gravel onto the pad.

PLANS AND SPECIFICATIONS

Plans and specifications for agrichemical handling facilities shall be in keeping with this standard. They shall be site specific and shall describe the requirements for applying this practice to achieve its intended purpose. Plans and specifications shall include construction plans, drawings, job sheets, or other similar documents. These documents are to specify the requirements for installing the practice, such as the kind, amount and quality of materials to be used, or the timing or sequence of installation activities.

The landowner is responsible for assuring that the facility is constructed in accordance with local building and electrical codes, if any, and for obtaining inspections for compliance with such codes.

OPERATION AND MAINTENANCE

Operation and maintenance (O&M) shall be in accordance with the requirements of this standard and shall be described in the Conservation Plan. A copy of the O&M plan should be located at the agrichemical handling facility.

The following O&M requirements shall be addressed:

Start-up

Before the first use of the agrichemical handling facility, the plumbing should be tested for leakage

and proper functioning of valves and pumps using clean water.

General

Keep the agrichemical handling facility clean at all times. The pad should be kept free of items not necessary for storing, mixing, loading, and clean-up operations. The facility should not be used for purposes other than storing, mixing, cleaning, and maintenance of materials and equipment used for chemical application.

Do not drain rinse water or rinsate from the sprayer onto the pad as a standard practice due to the probability of contamination by dirt, trash, and other pesticides.

Cross mixing of chemicals, chemical contaminated water, or chemical contaminated sediment must be avoided except where allowed by the chemical label.

Sump Operation

The sump should be thoroughly cleaned between discharge of different chemicals mixed at the facility. Sediment from the sump shall be removed with precautions taken to reduce exposure of the worker to any potential contaminants in the sediment. This chemical-laden sediment should be land applied to the target crop at a rate estimated to be below the label recommendation. The sump shall be pumped dry at the end of each day of operation.

Reinstate Tank Operation

The rinsate tanks used as holding tanks for sump discharge water should be emptied as soon as possible. The rinsate can be applied as a dilute pesticide or used as dilution water for subsequent batches of pesticides that are labeled for the same crop.

Inspection

Thoroughly inspect the agrichemical handling facility on a regular basis. The inspection should include, but is not limited to:

- cracks in the concrete pad and sump
- sealer on the interior surfaces of the pad, sump, and sidewalls
- operation of back flow prevention devices
- hoses, pipes, valves, connectors, filters, tanks, and related plumbing material
- safety equipment
- electrical systems
- roof & structural integrity of facility
- access roads and ramps
- drainage around building
- labeling of rinsate storage tanks that will ensure proper methods for applying rinsate back to the land
- chemical inventory

Repairs or material replacement should be attended to immediately.

Safety

To reduce the potential for exposure to pesticides and damage to the Agrichemical Handling Facility, restrict access by children, pets, livestock, and unauthorized people. Follow chemical label directions when handling chemicals.

Emergency response plan

Any spills, leaks, or accidents shall receive immediate attention. An emergency response plan shall be in place in the event of an emergency spill, including poison control center telephone numbers.

Laws and Regulations

Operation and maintenance shall be in conformance with all local, state, and federal laws and regulations.

Not only the chemicals themselves, but all materials which come in contact with chemicals and chemical contaminated material shall be handled as required by applicable regulations.

REFERENCES

MWPS-37, Designing Facilities for Pesticide and Fertilizer Containment.

Field Record Notebook for Crop Management and Restricted Use Pesticide Records, Alabama Cooperative Extension Service, 1994.